Surveillance of Heat-Related Illness in Missouri 1985–94

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Hyperthermia became reportable by law in Missouri effective April 8, 1993. Hyperthermia is defined as a physician-diagnosed case of heat exhaustion or heat stroke. Heat exhaustion means a reaction to excessive heat marked by prostration, weakness and collapse resulting from dehydration. Heat stroke means a severe illness caused by exposure to excessively high temperatures and characterized by severe headache; high fever with a dry, hot skin; tachycardia; and in serious cases, collapse, coma or death.

During the past ten summers, 153 Missourians have died of heat-related causes. The highest number of deaths occurred in the summers of 1987 and 1988 when 28 and 44 deaths occurred respectively. See Figure 1. The majority of heat-related deaths in Missouri occurred in St. Louis City. Of the total number of heat-related deaths, 62 percent occurred in persons age 65 or older. See Table 1. The rate of mortality increased sharply at older ages as seen in Figure 2. This emphasizes the need to be very supportive of the elderly when temperatures are unusually hot.

Table 1. Heat-related deaths and rates per 100,000 population by age group, Missouri, 1985–94.

Age Group	Frequency	Rate
0–4	2	.53
5–14	1	.13
15–24	3	.41
25–34	7	.82
35–44	8	1.09
45–54	12	2.30
55–64	24	5.24
65–74	33	8.39
75–84	34	14.03
85+	28	35.00
Unknown	1	
Total	**153**	

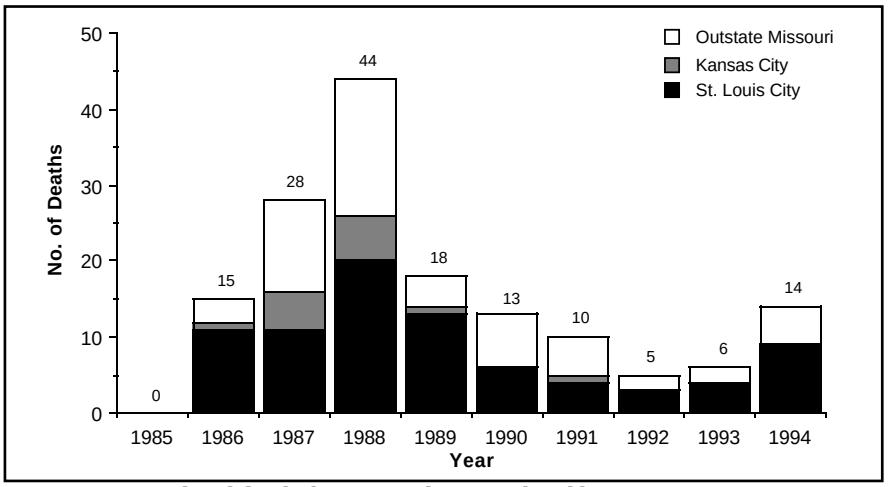

Figure 1. Heat-related deaths by year and geographical location, Missouri, 1985–94.

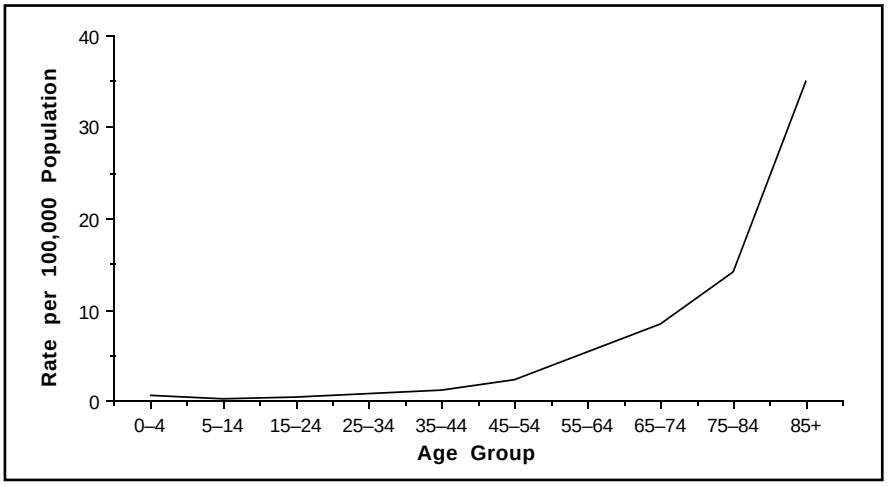

Figure 2. Heat-related death rates per 100,000 population by age group, Missouri, 1985–94.

1994 Heat Surveillance Summary

The summer of 1994 in Missouri started with gradually warming temperatures until mid-June when heat indices approached 100˚ across the state. The Department of Health issued its annual news release urging awareness of heat-related illnesses on June 13. On June 19, heat indices reached 108˚ in St. Louis, 101˚ in Kansas City, 108˚ in Columbia, 102˚ in Springfield and 109˚ in Cape Girardeau. This prompted the Department of Health to issue a statewide heat alert on June 20. Heat indices did not remain as high as predicted and the statewide heat alert was canceled on June 24. Temperatures remained relatively comfortable for the remainder of the summer except for a one-day peak on July 19, when heat indices reached 107˚ in St. Louis, 103˚ in Kansas City, 107˚ in Columbia, 103˚ in Springfield and 106˚ in Cape Girardeau. A forecast of extremely hot and humid conditions across the state for the Fourth of July weekend led the Department of Health to issue a news release on July 1 advising Missourians to take precautions to keep cool over the holiday weekend. Heat indices on July 4 reached 108˚ in St. Louis, 103˚ in Kansas City, 104˚ in Columbia, 102˚ in Springfield and 101˚ in Cape Girardeau.

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person's body temperature followed by intensive supportive care.

Signs of Heat Stroke:

- Body temperature 104˚F or above
- Headache, dizziness, irritability
- Difficulty breathing
- Hot, red, dry skin
- Rapid, strong pulse initially, then weak and rapid
- Fainting, delirium or seizures may occur

What to do:
- **Seek medical attention at once**, then:
- Keep victim lying down in a cool place.
- Remove victim's clothing and cover with a wet sheet.
- Use air conditioner or fan to cool victim (see paragraphs on fans)
- Give nothing by mouth

Heat exhaustion is milder than heat stroke and typically occurs after several days of high temperatures. Although heat exhaustion is often severe enough to require hospitalization—especially of the elderly—death is uncommon. Treatment includes replacing fluid and electrolyte losses.

Signs of Heat Exhaustion:

- Normal or slightly elevated body temperature
- Pale, clammy skin
- Profuse sweating
- Tiredness and weakness
- Nausea, dizziness, and fainting possible

What to do:
- Lie down in cool area with head and shoulders lowered or legs elevated.
- Loosen clothing.
- Sip salt solution (one teaspoon of salt in 8-ounce glass of water).
- Drink plenty of non-alcoholic liquids.
- Seek medical attention for severe cases.

The most effective ways of avoiding heat-related illness include: reducing physical activity, drinking extra liquids and increasing the amount of time spent in air-conditioned environments. Heat-stressed persons who are unacclimatized often do not drink enough fluids to keep up with fluid losses; such people must make a conscious effort to drink extra fluids. People may also be able to reduce their risk for heat-related illness by scheduling physical activity during the cooler parts of the day, avoiding alcohol consumption, and remaining in air-conditioned environments as much as possible. Being in an air-conditioned environment, even for part of the day, will reduce the risk for heat stroke. The elderly and others at high risk should be encouraged and assisted to take advantage of air-conditioned heat-wave shelters or to seek relief from the heat in air-conditioned public places such as shopping malls.

Taking salt tablets is not recommended and can be harmful to people with such illnesses as high blood pressure and heart conditions.

Fans May Help or Harm:

Fans are less expensive than air conditioners and will increase comfort during hot weather, but when temperatures are very high they are not protective and may add to the body burden of heat. In order for a fan to be effective in cooling the body, the skin surface must be moist. When the skin surface is moist, moving air removes heat from the skin as the moisture evaporates. Unfortunately, when a person begins to develop heat stroke, they stop sweating and evaporative cooling stops. Also, elderly persons may not sweat due to poor heat regulation messages from the heat regulatory center in the brain. To restore the cooling effect of fans after sweating has stopped, it is essential to moisten the skin surface with damp cloths or to dampen the clothing.

Another problem with fans occurs as the air temperature rises to very high temperatures. As the air temperature approaches 100˚F, the air flow is increasingly ineffective in cooling the body and at temperatures exceeding 100˚F, the fan may be delivering overheated air to the skin at a rate that exceeds the capacity of the body to lose this heat even with sweating. The net effect is then to add heat rather than to cool the body. For this reason, the distribution of fans as part of heat wave relief, is not recommended. The better alternative, by far, when the temperature soars is to use an air conditioner if one is available or to seek shelter in an air-conditioned building.

REFERENCE:

National Center for Environmental Health, Centers for Disease Control and Prevention. Public health network message regarding heat-related illness dated July 12, 1993.

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The Department of Health issued a news release on June 30, 1994 cautioning Missourians on the safe use of fans.

In 1994, there were 14 heat-related deaths recorded, which was more than double the six heat-related deaths recorded in 1993. All heat-related deaths in 1993 and 1994 occurred in individuals age 45 and older, except for one death in 1993 in an infant under 1 year of age.

In 1994, 274 heat-related illnesses were reported, which was slightly higher than the 221 heat-related illnesses reported in 1993. The highest number of illnesses in 1994 was reported during the Fourth of July weekend and was associated with the VP Fair held in St. Louis. The second highest number of illnesses was reported during the statewide heat alert issued June 20–24.

As in past years, the St. Louis area accounted for the majority of reported heat-related illnesses and recorded heat-related deaths in 1994, accounting for 179 (65%) of the heat-related illnesses and 9 (64%) of the heat-related deaths. Public health authorities in the St. Louis metropolitan area declared three heat warnings during the summer of 1994, on June 19, July 5 and July 20.